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## Citation for Chemical Breakthrough

The Development of Boron-containing Compounds as Important  
Reagents in Organic Synthesis

Brown, H. C.; Subba Rao, B. C.  
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### A NEW TECHNIQUE FOR THE CONVERSION OF OLEFINS INTO ORGANOBORANES AND RELATED ALCOHOLS

*Sir:*

In the presence of aluminum chloride the reducing powers of sodium borohydride are greatly enhanced.<sup>1</sup> We now wish to report that this reagent readily reacts with simple olefins, such as ethylene, 1- and 2-pentene, cyclohexene, and styrene, at temperatures of 25°, to form the corresponding trialkylboranes in yields of 90%.

Trialkylboranes are readily oxidized to the borate esters<sup>2</sup> which can be hydrolyzed to the corresponding alcohols. The reaction can be carried out without isolation of any of the intermediates. In this way cyclohexene has been converted into cyclohexanol, 1-hexene into 1-hexanol, styrene into 2-phenylethanol and 1,1-diphenylethylene into 2,2-diphenylethanol. The yields based on olefin are good, in the range of 70-90%.

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